

REMARKS

Applicant is filing an RCE and a Petition for Two-Month Extension concurrently herewith.

Upon entry of the present amendment, the claims in the application remain claims 1-20 and 23-26, of which claims 1, 8, 11 and 18 are independent, and of which claims 11-15 have been withdrawn from consideration by the Examiner as being directed to a non-elected invention.

Applicant gratefully acknowledges the Examiner's allowance of claim 8.

Independent claims 1, 11 and 18 have been amended to further define that the bent back portions become end portions of the hollow cylindrical body and are bent to an inner peripheral side of the hollow cylindrical body, while dependent claims 2, 5, 7, 17 and 19 are amended to be consistent with the amended independent claims.

Applicant respectfully submits that the above amendments are fully supported throughout the original disclosure, including the discussion at page 16, lines 3-24 of the specification and the drawings. Applicant further respectfully submits that no new matter is introduced by the above amendments.

Rejection Under 35 USC §103(a)

The Examiner has rejected presents a single rejection of all claims 1-7, 9, 10, 16-20 and 23-26 under 35 USC 103(a) as allegedly being unpatentable over the winding of Figs. 15, 16 and the windings shown on page 47 of the textbook by Kenjo et al in combination with Marchegiani (WO 90/10336-A1) and Umeda et al. (US Patent 5,955,810). This rejection is very similar to the rejection presented in the Office Action of 21 November 2002. Claims 11-15 remain withdrawn from consideration by the Examiner as being directed to a non-elected invention.

Particularly, as set forth at page 3 of the Office Action, it is the Examiner's position that the conventional stator windings of Figs. 15-16 and Kenjo as modified to include the wire of Marchegiani teach the invention as claimed, except for the features defined in the last clause of independent claims 1 and 18, but that it would have been obvious to a person skilled in the art at the time of the present invention to have further modified the conventional winding to include such features based on teachings of Umeda pertaining to a vehicle alternator, with motivation to increase the cooling of the stator wire.

Additionally, as set forth on page 2 of the Office Action, it is also the Examiner's position that method limitations in an apparatus claim are not germane to patentability, and that the conventional windings of Figs. 15-16 and Kenjo show segmented shifting as evidenced by the plurality of electrical taps located about the circumference of the hollow cylindrical body forming the core.

Applicant's Response

Upon careful consideration and in light of the above amendments, applicant respectfully submits that the rejection is overcome and that each of present claims 1-7, 9, 10, and 16-20, and 23-26 is clearly patentably distinct over the applied art because: the proposed modification of either the winding of Figs. 15, 16 and the windings shown on page 47 of the textbook by Kenjo based on a select feature of Umeda (the stationary blade feature of his inner-fan type vehicle alternator) is improperly based on a suggestion coming entirely from the Examiner (guided by impermissible hindsight of the present disclosure), rather than from any teaching or suggestion which may be fairly gleaned from the references themselves; the applied art does not otherwise include, teach or suggest features of the claimed stator winding, such that any hypothetical combination of the applied art resulting from the actual teachings thereof would fail to achieve or make obvious the claimed invention; and the conventional windings do not achieve the significant advantages that are achieved by the claimed invention.

Regarding the proposed modification, applicant respectfully submits that Umeda's automotive inner-fan type alternator, including its slotted stator 40 with coil end groups 54, 55 having stationary blade shapes, is *fundamentally distinct from and incompatible with* a slotless stator such as shown in Figs. 15-16 or in the Kenjo textbook, and based on such distinctions and incompatibilities persons of ordinary skill in the art would never (in the first place) have looked to the Umeda patent even if such persons were hypothetically considering the possibility of modifying the slotless stator windings of Figs. 15-16 or Kenjo, nor would such persons consider the modification proposed by the Examiner to be obvious.

Umeda's alternator is three phase such that its armature coil 50 includes three coil groups 51-53 with two coils being provided on a bundled basis for each coil group, and in the manufacture of the alternator four coils/windings are wound on the stator iron core 41 (into each of the slots defined in the stator's iron core 41) on a lap basis. See col. 7, lines 8-14 and col. 8, lines 1-34. The coil end groups 54, 55 are sets of plural coil ends 56, while each coil end 56 includes two unit electric conductors 56a, 56b which are insulated from each other and have circular cross sections, and are arranged in parallel to form a belt-like member 57, each having a stationary blade shape and forming a bridge between different slots in the core 41. Again, see col. 8, lines 1-34. Further, "The belt-like members 57 are spaced from each other by suitable clearance or gaps, and thus air passages are formed therebetween." See, col. 8, lines 35-37. As explained by Umeda, the specific purpose of forming the belt-like members 57 in the discussed manner is to form passages for cooling winds generated by fans 33, 34 disposed at opposite ends of the rotor 30 of

the alternator (as driven by a belt connected to the vehicle engine), and the particular construction of the belt-like members 57 remarkably reduces the sound of interference between the cooling winds and the coil ends 56. See col. 8, lines 44-57.

In stark contrast, according to the slotless stator windings of Figs. 15-16 and Kenjo, which are suitable for a high output, high speed rotating electrical machine, adjacent turns of the winding are disposed closely together in contact with each other. In such high speed rotating electrical machines, it is conventionally desired to miniaturize the stator coil as much as possible, particularly in its axial direction, and in accord with convention, the winding turns of Figs. 15-16 and Kenjo are strictly rhombic so that when the stator is formed into a cylindrical body, the amount of the windings exposed from the stator is kept to a minimum. See the background section of the present application.

Given such distinctions and incompatibilities between features of Umeda's alternator stator and the stator windings of Figs. 15-16 and Kenjo, persons skilled in the art would not consider it obvious to hypothetically modify the stator windings of Figs. 15-16 and Kenjo to include a select feature of Umeda's vehicle alternator (the stationary blade shaped belt-like members 57) because the references provide no motivation for the proposed modification. For example, the reason for the stationary blade shaped members 57 in Umeda (to efficiently and quietly receive the cooling air flow from the fans 33, 34) does not apply to the windings of Figs. 15-16 and Kenjo which have no such fans associated therewith. As another example, the slotted nature of Umeda's stator, including the stationary blade shaped belt-like members 57 which are spaced from each other and formed in the process of winding the coils in the stator slots, is completely incompatible with the formation of the cylindrical body windings of Figs. 15-16 and Kenjo, in which adjacent turns are necessarily in contact with each other. Without going through the entire list of incompatibilities, the full fair teachings of the applied art do not support the modification proposed by the Examiner, but rather are evidence of the non-obviousness of same.

In this regard, appellant notes that the Courts and the Board of Patent Appeals and Interferences (BPAI) have consistently held that, for purposes of establishing obviousness under 35 USC '103, a rejection advanced by an Examiner must rest on a factual basis, with the facts being interpreted without hindsight reconstruction of the invention from the prior art, and that the Examiner may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis. Ex Parte Hamond, 41 USPQ2d 1217, 1220, citing In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). Applicant respectfully submits that

the modification to the windings of Figs. 15-16 and Kenjo as proposed by the Examiner, including the alleged motivation, do not establish the necessary factual basis as discussed in the cited cases, but rather involve the impermissible hindsight construction which the courts warn against.

Moreover, applicant respectfully submits that even if Umeda's teachings were somehow combined with the winding of Figs. 15-16 or Kenjo and the wire of Marchegiani, the specific location and orientation of the claimed bent back portions is in no way suggested by any of the applied art, and such feature is correspondingly not made obvious by any hypothetical combination of the applied references/teachings. For example, Umeda's stationary coil groups including the stationary blade shaped belt-like members 57 do not include rhombic shaped turns, while the stationary blade shaped belt-like members 57 do not become ends of a hollow cylindrical body and are not bent to an inner peripheral side of the hollow cylindrical body as now defined in independent claims 1 and 18. On the other hand, in the windings of Figs. 15-16 and Kenjo, the winding turns are rectangularly shaped, with no bent back portions disposed outside of the rectangular (rhombic) shape.

Further, applicant respectfully submits that the applied art does not teach or suggest the claimed winding which is formed as a hollow cylindrical body formed by multiple steps as defined in claims 1 and 18, i.e., forming rhombic shaped turns of the wire sheaf, forming approximately rhombic shaped coil segments of a continuous length of the wire sheaf by arranging a plurality of the turns so as to be sequentially shifted *in the direction* (singular) of one diagonal of the rhombic shape, forming a band shaped body with a plurality of the coil segments sequentially shifted in the direction of *the one diagonal* and rolling the band into a hollow shaped body. As discussed throughout the present application, use of the intermediate steps/features of forming the coil segments from a plurality of continuous turns, and then forming the band shaped body from a plurality of the coil segments sequentially shifted in the direction of the one diagonal results in a multi-layered construction for higher output and miniaturization of the stator.

Conversely, while the conventional winding of the applied art may include a multi-layered hollow cylindrical body, as understood from the disclosures of Kenjo and Kristiansen, the conventional method steps used in forming such body are clearly quite different than those defined in the present claims, as best understood from the full disclosure of Kristiansen. Particularly, as understood from Kristiansen's Figs. 2-3 and the discussion of same, there are *no distinct segments* formed by arranging a plurality of rhombic shaped turns arranged so as to be sequentially shifted *continuously in a direction of one diagonal* of the

rhombic shape, nor is there a band shaped body formed using a plurality of the coil segments *sequentially shifted in the direction of the one diagonal* so as to be adjacent to each other. Rather, in the conventional windings, the band shaped body is formed as *one continuous segment* including multiple layers of rhombic shaped turns of wire, wherein the turns in each layer are shifted (theoretically by one half the diameter of the wire) from the turns in adjacent layers by *reversing the direction of axial advancement of the turns after every few turns are wound*. There is no winding of turns so as to be *sequentially shifted in a (one) direction* to form segments, and there is no sequential shifting of segments to form a band shaped body.

Thus, even if the single wire of the conventional winding is replaced with a stranded conductor sheaf, such as disclosed by Marchegiani, any resulting winding would still not achieve the invention of claims 1 and 18 involving plural shifted segments.

In this regard, applicant respectfully traverses the Examiner assertions at page 2 of the Office Action because the assertions are not supported by the evidence of record or the law. On the one hand the mere existence of the electrical taps located about the circumference of the hollow cylindrical body forming the core of Figs. 15-16 and Kenjo does not establish that the windings include shifted segments, as understood from Kristiansen US Patent 3,995,364 (e.g., see his Figs. 1-4) which depicts the construction of a conventional winding such as in Figs. 15-16 and Kenjo including electrical taps which are not formed by shifting segments of the windings. On the other hand, a method limitation is quite germane, and must be given patentable weight, in a product-by-process claim wherein the method step results in a distinct structure, as is the situation in the present matter.

Further, applicant respectfully submits that the additional, related features of the dependent claims pertaining to the multi-layer structure of the claimed winding and just how it is achieved according to the invention, are also not achieved or suggested by the applied art. For example, claims 2 and 19 define the specific manner in which opposite end portions of respective turns (each turn) located in a direction of a diagonal orthogonal to the direction of axial advancement/shifting of the turns are wound opposite to each other relative to outer and inner peripheral sides of the hollow cylindrical body, while claims 3 and 20 define that the approximately U-shape of the bent back portions. As explained throughout the application, particularly in relation to Figs. 3-5 and 8, such claimed features result in the slotless stator which realizes high output and miniaturization in comparison to the conventional stator windings such as shown in Figs. 15-16, which are not wound in the defined manner, and do not include the discussed bent back portions.

Based on the foregoing, applicant respectfully submits that the Examiner's rejection under 35 USC §103(a) is overcome in relation to present claims 1-7, 9, 10, 16-20 and 23-26. Accordingly, it is respectfully requested that such rejection be reconsidered and withdrawn.

Conclusion

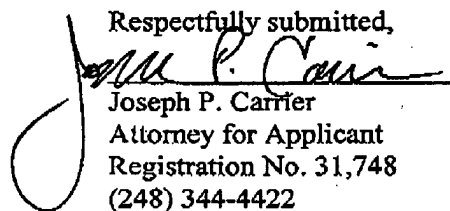
In conclusion, applicant has overcome the Examiner's rejection of claims as presented in the Office Action; and moreover, applicant has considered all of the references of record, and it is respectfully submitted that the invention as defined by each of the present claims is clearly patentably distinct thereover.

The application is now believed to be in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner is not fully convinced of all of the claims now in the application, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

Favorable reconsideration is respectfully requested.

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CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being sent via facsimile transmission to the US Patent & Trademark Office, Art Unit 2834, on February 27, 2004.

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